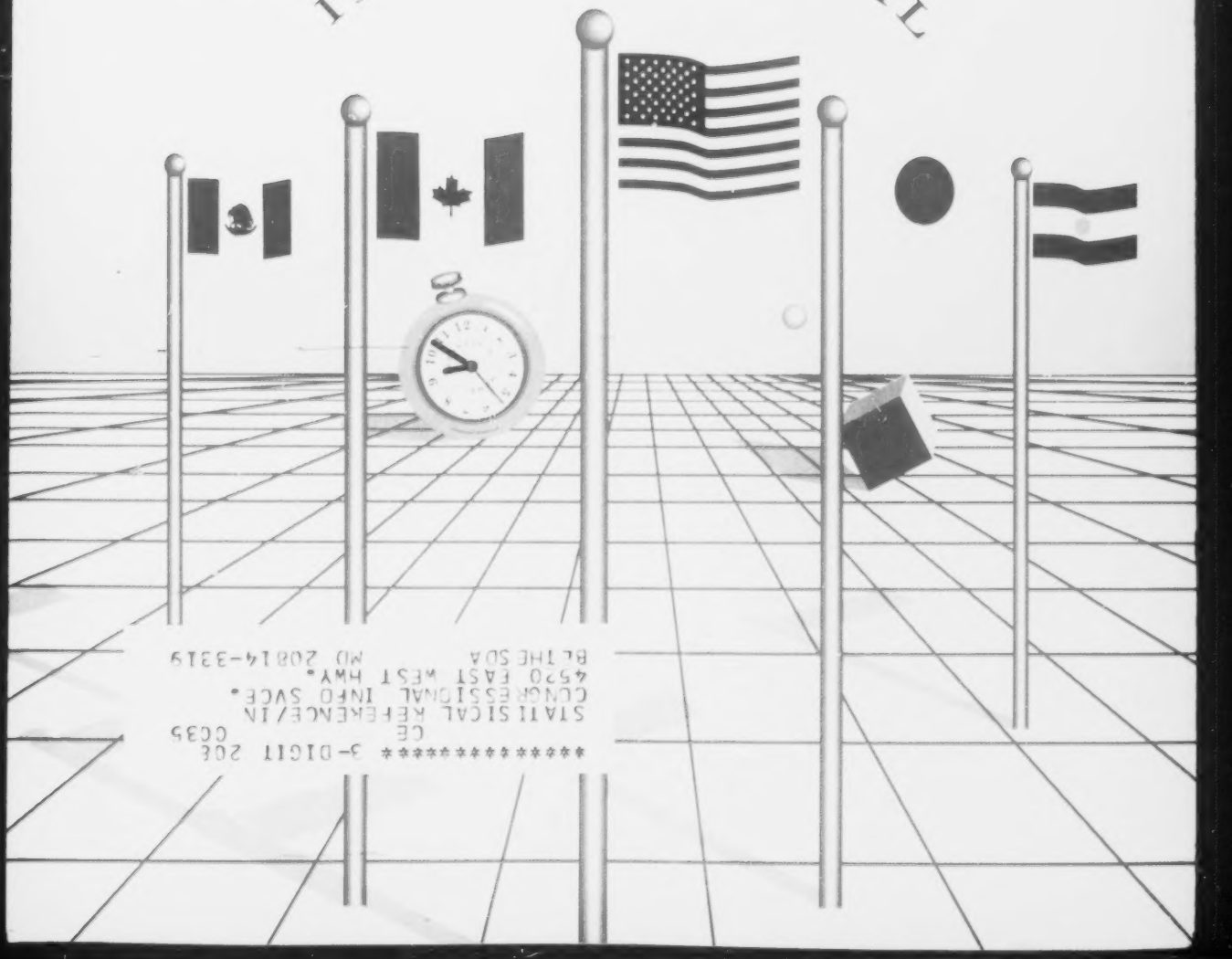
CHILTON'S

AUTOMOTIVE INDUSTRIES

NOVEMBER 1991

THE PEOPLE THE PRODUCT THE PROCESS

6th ANNUAL DIE CHANGE CHALLENGE INTERNATIONAL



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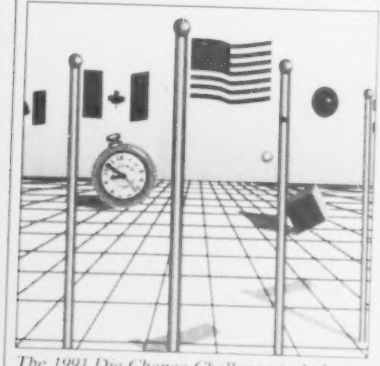

The 1991 Die Change Challenge includes Japan, Argentina, Canada, Mexico and the US. Page 26. Cover illustration by Robert Bernstein.

CHILTON'S AUTOMOTIVE INDUSTRIES

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An international focus with more plants and more teams.

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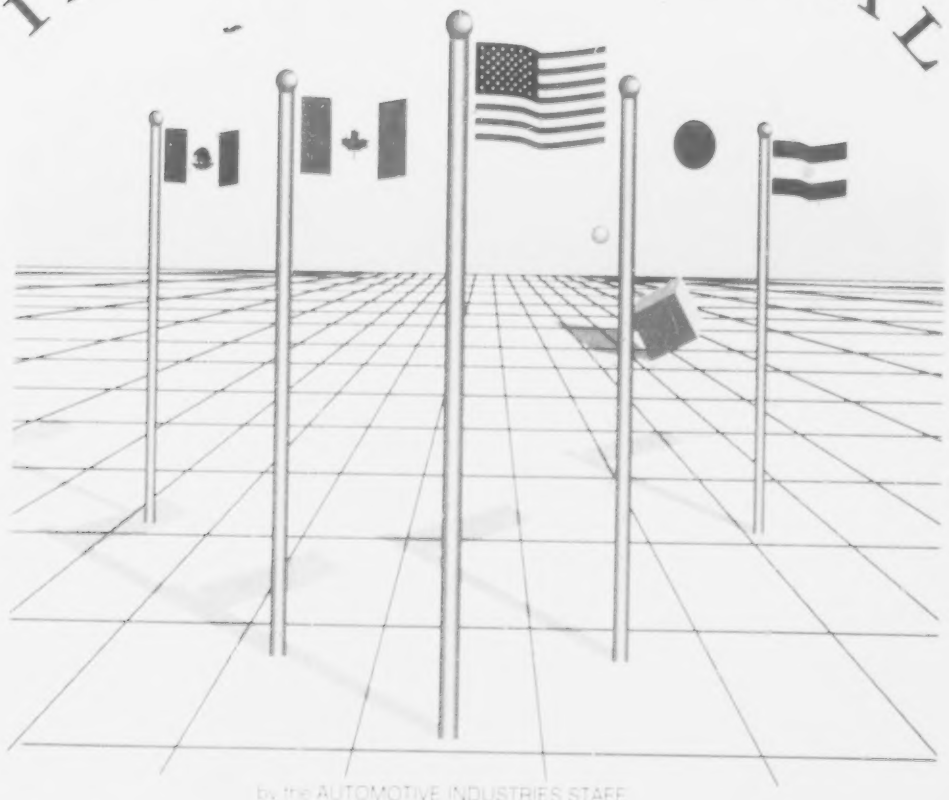
6th ANNUAL DIE CHANGE CHALLENGE INTERNATIONAL



by the AUTOMOTIVE INDUSTRIES STAFF

Every year the Die Change Challenge gathers momentum. We get more plants that want to enter. More teams that want to participate. And, measured on a geographical basis, more countries that are represented.

This year we received entries from Argentina and Japan – in addition to the United States, Mexico and Canada – which has given the competition a truly international flavor. And as you might expect, the intensity and creativity of the participants has risen to a new level.

In fact, we were caught completely off guard by just how creative these people can be. The rules of the Die Change Challenge stipulate that the most efficient team will be declared the winner in each category and in the overall classification. We calculate this efficiency by multiplying the number of people on the team by the time it took to do the die change. Obviously, the fewer people involved, the more efficient the team becomes.

Well, much to our surprise, there were four plants that entered this year which didn't have anyone on their team! That's right, there were able to completely automate the process. They developed a software program that counts the number of blanks that runs through the pressline and once the pre-programmed number of blanks have gone through, the press automat-

MORE PLANTS, MORE TEAMS, MORE INTERNATIONAL

ically changes dies and starts making new parts.

The plants that did this included BOC's plant in Lansing, MI, Ford's plant in Walton Hills, OH, and CPC's plants in Parma, OH and Oshawa, Ontario.

Needless to say, this produced a lot of discussion on the *AI* staff regarding how we should interpret the rules. In the end we decided to include the person who actually sat down at the computer and entered the number of blanks to be counted as a member of the team. After all, there are other plants where the die change is done automatically after one person pushes a button on the control panel. But even so, our hats are off to these people. They are amazingly creative.

The whole process of visiting 18 plants in five different countries was squeezed in over a six month period. And each team at each plant treated us to a valuable lesson in how people working together can achieve significant improvements in productivity. We're sure you'll enjoy each story.

TRANSFER LINES

Ford Walton Hills

You know there's something different about the Walton Hills die change right from the start. It's not the equipment or the panels they run, it's the stern look on the face of the one-man die change team – Mark Aster. And if that's not enough, ponder this. His fellow employees affectionately refer to him as "God."

We arrived early enough to time a three-minute practice run, and while we were impressed by the savings in man minutes that it represented over last year's effort, Aster didn't agree. In fact, he glared at the slow-to-engage main motor and issued an unspoken threat.

Now at peace with his equipment, Aster indicated that he was ready for the Die Change Challenge. The clock started. The equipment moved quickly as he ran the carts into the press. All the while he continued to glare at the main motor.

With new dies in place and the gates closed, Aster pushed the button to start the press. The motor responded instantly, and in 2:24 the first panel was on the conveyor.

In a meeting that followed, Aster told *AI* that we had just seen the fastest time ever run by that line. "We're pretty much to the limit of the press," Aster said. "It's to the point of no payback." He added that even in normal day-to-day die changes, the line is running five or six minutes with only two or three people.

But having said that, he did note that they could put more air to the die carts, pump up the programming and maybe stop the rams short to get under the two minute mark. "Yeah," he said with a smile. "Next year we could be under two minutes. Then we could work on eliminating me!"

Diamond-Star

We expected quick times from Diamond-Star, and we got them. We also got something of an impromptu battle between the first and second shifts.

Line A was staffed by Terry Campbell, a member of the plant's first shift, while Line D had Jeff Gardner at the controls. Campbell, who ran first, went from the Eclipse/Laser/Talon tailgate upper outer panel to the same vehicle's right hand door outer, while Gardner changed from a Mirage/Summit trunk outer upper panel to an Eclipse, etc. lower tailgate outer. Each was at the controls of a Komatsu fully automatic transfer line running hot-rolled coated steel.

Campbell's run was executed flawlessly, the process over almost before it began. At three-quarters of a second under three minutes, Campbell had set a time Gardner was going to have to work hard to beat. This despite the fact that the crew on Gardner's line had already modified the automation reset, and adjusted the timers that bring the bolsters into place.

And beat it Gardner would have – if the cushion pads had deployed on cue. But they didn't. Gardner was then forced to wait for the die change to finish before he could switch to manual, enter the "garage doors," and raise the pads. That glitch, he surmised, was worth 15 seconds. He turned a 3:08.56, but ran second to Campbell.

C-P-C Parma

Why is everyone smiling? Why are there so many people standing around? Why does it seem like everyone knows something that we don't? Are we missing something?

Well, no. Actually it's Parma that's missing something – people! There're no people on this die change!

It had to happen sooner or later. A little tweak from the tool and die folks, a little commonized tooling, some rewriting of the software and...presto! The transfer press runs its last right-hand W-Car longitudinal rail, a siren sounds, the dies change and boom, boom, boom – out come left-hand rails.

To make matters worse, Parma has even made *AI*'s job unnecessary. How? At the end of the die change, our watch stopped at 4:17. "What time did we do?" yelled one of the workers. But before we had a chance to answer, he looked at the control monitor and said "Oh, 4:17, not bad."

Yup, you guessed it. This thing times itself too!

In a meeting that followed, the team members that made the unmanned die change possible said they asked what the rules were and just worked within them. They said all of the software wizardry was done in-house, and while

they weren't eager to share with the outside world, they would be willing to pass secrets along to sister plants.

They obviously share their secrets internally. During our walk through the facility, we learned that the plant average die change time went from eight hours to less than one. And it's still going down!

That's music to our ears.

Ford Chicago

The road to a hands-off die change began when Ford's Chicago stamping plant crew looked at how to implement a demand-pull stamping operation run according to the daily output at each assembly plant it serves. This JIT system, they reasoned, would cut costs and delays, and make the Chicago stamping plant a 24-hour-a-day operation. But it took the help of the Square D Company, the Line 12 team and Ford manufacturing to make hands-off die changes a reality, and demand-pull operation a possibility.

Although there is an operator on Line 12, his only involvement in the die change procedure is to tell the computer how many panels to run before initiating the change. From the last panel off to start-up with the new die set, everything happens automatically – a process made abundantly clear when the workers stood with their hands behind their backs during the die change.

Even more amazing was that there was little of the expected rank-and-file resentment. In fact, the 12-man crew responsible for this line not only claims 'ownership' of it, but continues to push the envelope toward even faster die changes. "We're doing it so our kids have something to look forward to," said one participant.

So amid cheers from the onlookers, Line 12 went from an aluminum Grand Marquis hood outer to its Crown Victoria counterpart in 4:31, one minute under the group's original goal.

DIE CHANGE TIME COMPARISON

COMPANY	PLANT	CATEGORY	TIME
Hirotec	Hiroshima	Automated Tandem	1:27
B-O-C	Lansing	Automated Tandem	2:15
Ford	Hermosille	Automated Tandem	2:19
Ford	Walton Hills	Transfer	2:24
Honda II	Marysville	Automated Tandem	2:36
Diamond-Star I	Normal	Transfer	2:59
Diamond-Star II	Normal	Transfer	3:08
Nissan	Aguas Calientes	Transfer	4:11
C-P-C	Parma	Transfer	4:17
Ford	Chicago	Transfer	4:31
C-P-C	Oshawa	Transfer	5:42
Honda I	Marysville	Transfer	6:04
Chrysler II	Twinsburg	Automated Tandem	6:07
Honda	Alliston	Automated Tandem	6:22
B-O-C I	Pittsburgh	Manual Tandem	9:41
B-O-C II	Pittsburgh	Manual Tandem	10:04
C-P-C	Grand Rapids	Transfer	10:35
B-O-C	Buick City	Semi-Auto Tandem	10:47
C-P-C	Marion	Transfer	11:56
Renault II	Argentina	Manual Tandem	13:32
Renault I	Argentina	Manual Tandem	15:47
Chrysler I	Twinsburg	Automated Tandem	17:46
Cadillac	Grand Blanc	Manual Tandem	23:40

C-P-C Oshawa

With only two months to go before they would compete in the Die Change Challenge, the people at CPC Oshawa were starting to get concerned. Even though they had been steadily improving their time, it still took 60 operations and 45 minutes to do a die change – not good enough.

At this point the die change team decided it had to completely revamp its procedures. First of all they concentrated on reducing or eliminating all internal set-up. Andrew Odell, a tool and die maker in the plant, decided to modify the tooling inside the press so it could several different parts. He improved the flexibility of the tooling to such an extent that they now use just one blank for both parts instead of two.

This will add up to considerable cost savings over time and will help the plant reduce its inventory in blanks.

The tooling changes made to the press saved nearly 20 minutes, but that still left 25 minutes per die change – still too much.

At this point Fred Porringa, the plant's electrical and programming 'wizard,' tackled the automatic sequencing of the press. As originally designed in Japan, it took the press 15 minutes to go through its sequences. Porringa was able to reprogram the press line so that it now goes through those operations in only three minutes.

Not only has the plant improved its die change times, it has put that extra time into making more parts. "We don't seem to be scrambling as much for production," says Porringa.

Honda Marysville I

Just a week before we were scheduled to do Marysville's die changes, lightning struck a power station in nearby Urbana that sent a spike to the computer in the plant's D-Line. In the blink of an eye, the programming for the line was gone (What, no backup?) and the program from C-Line had to be downloaded to get the giant 4800-metric ton Hitachi Zosen up and running.

First attempts were futile and much of the programming had to be input by

hand. The day prior to our arrival, the press was finally "bug-free," giving Honda only one day to practice.

The one-man die change was performed by Terry Nicol, who would oversee the change from Civic front door outers to Civic rear door outers. When the change started, everything seemed to be going Terry's way, as the press was moving toward a sub-five minute time. But after the new dies were in place, one of the blanks didn't set properly in the draw die and the sensors on the press wouldn't allow it to trip.

Nicol had to do some fast work as he shut off the press, raised the gates, adjusted the panel by hand and then reversed the procedure. When the first panel hit the conveyor at 6:04, it was about a minute later than if there hadn't been a glitch.

Undaunted, Nicol sees potential in making the clutches engage faster, and also in boosting hydraulic pressure to speed the transfer. He has ideas to get next year's time near the four minute mark.

Nissan Aguas Calientes

We were very pleased to have Nissan's plant in Aguas Calientes enter the Die Change Challenge. It gave us the opportunity to visit this massive manufacturing complex which has two engine plants, an aluminum foundry, a transaxle plant, a sheet-metal subassembly plant, and a stamping facility.

It also has a $1 billion car assembly plant under construction that will come on-line a year from now. Without a doubt, Nissan's Aguas Calientes plant is going to play a major role in the North American auto industry.

With production about to ramp up in the coming year, the stamping people are concentrating on making more parts on every press line. And quick die changes are playing a key role in achieving this production increase. For example, a year ago the Hitachi press that was entered in the Challenge was making 8000 to 9000 panels a day. But reducing the die change time created more production time. Now that press is capable of making 11,000 panels a day.

According to the team, the most important part of reducing its die change time was how the various groups in the plant contributed ideas. They got input from stamping and die engineering, maintenance, production, inspection and material handling. And as they implemented these ideas they were able to chip away at the 20 to 25 minutes it used to take to change dies. Now they can consistently change dies on this line in less than five minutes. "We can't just do this for the Die Change Challenge. It has to be a daily operation. And it will be," promises Gerardo Martinez, the die maintenance auxiliary supervisor.

C-P-C Marion

Six weeks before we arrived, it took one hour to do a die change at the C-P-C Marion, IN stamping plant. A scant 30 days before we showed up, Gene Pischoff – the man in the spotlight – had a personal best time of 38 minutes. But by the time we walked out the door, Pischoff stopped the clock in less than 12 minutes.

In that 30-day period, the first and second shifts, given the chance to rearrange the die change process, moved to simplify. Common tooling for left and right panels replaced separate pieces. Nesting fingers were replaced by pads. Bolt-on fiber optic connections were given T-handles. All control switches were moved to the master console. New stock was indexed to the line (a change worth three minutes alone). The bolster and rails were adjusted to a common speed. And the die clamping flow control valve was adjusted to take the 'bounce' out of the die. In all, the workers eliminated the need to change 42 pieces.

The air was electric as a nervous Pischoff moved faultlessly through his routine, and a large cheer erupted as the official time was announced:

OVERALL CLASSIFICATION

COMPANY	PLANT	CATEGORY	TOTAL EFFICIENCY (Employee-minutes)
B-O-C	Lansing	Automated Tandem	2.25
Ford	Walton Hills	Transfer	2.40
Diamond-Star I	Normal	Transfer	2.98
Diamond-Star II	Normal	Transfer	3.13
C-P-C	Parma	Transfer	4.28
Hirotec	Hiroshima	Automated Tandem	4.35
Ford	Chicago	Transfer	4.51
C-P-C	Oshawa	Transfer	5.70
Honda I	Marysville	Transfer	6.06
Honda	Alliston	Automated Tandem	6.36
Honda II	Marysville	Automated Tandem	7.80
Nissan	Aguas Calientes	Transfer	8.36
Ford	Hermosillo	Automated Tandem	9.26
C-P-C	Marion	Transfer	11.90
C-P-C	Grand Rapids	Transfer	21.16
Chrysler I	Twinsburg	Automated Tandem	24.40
Chrysler II	Twinsburg	Automated Tandem	71.00
B-O-C II	Pittsburgh	Manual Tandem	100.60
B-O-C I	Pittsburgh	Manual Tandem	106.50
B-O-C	Buick City	Semi-Auto Tandem	194.10
Renault II	Argentina	Manual Tandem	203.00
Renault I	Argentina	Manual Tandem	236.70
Cadillac	Grand Blanc	Manual Tandem	331.30

11:56.50. Once the ice was broken, workers from other lines talked of taking up the die change gauntlet, and plans were made for monthly in-plant challenges and procedural documentation of further changes. Yes, competition does indeed improve the breed.

C-P-C Grand Rapids

Tom Bouwens and Wally Hodges were ready. Just an hour before we arrived they had pulled off a 7:02 die change, before tweaking the machinery a little more. Talk ran rampant of a six minute die change.

The catwalk above was crowded with noisy spectators as Bouwens and Hodges paced the floor like sailors in the last minutes of a three-day leave. They would be going from the right rear Caprice sedan door outer to its station wagon counterpart, and were anxious to start.

In no time flat Bouwens was flying around the double-action press at the start of the massive chain. Hodges, meanwhile, went to work inside the "garage doors" where the rest of the machinery lay. And then, just about five minutes into the change and with a sub-six minute time within reach, everything ground to a halt.

The changes made after the morning run (said to be good for 35 seconds) threw the timing off, causing a chair table to hit one of the shovels, closing one contact and opening another. Agonizing minutes passed as the trouble was traced, retraced and finally corrected.

But by this time it was too late. The damage had been done. When the first panel finally exited the maze, more than ten minutes had passed. Bouwens and Hodges were downcast. But true to the competitive spirit of the Die Change Challenge, both vow to return next year.

MANUAL TANDEM LINES

B-O-C Pittsburgh I

You have to give credit where credit is due, and the people of BOC Pittsburgh have a lot coming. First you have to realize that this was one of the plants GM had scheduled to close. But the management and workers concocted a brilliant scheme for survival.

They proposed that they stamp all the service parts for the various GM divisions. And after putting together a viable business plan that showed they could be very cost effective—that's exactly what they're doing. Right now they're even looking for business outside of GM.

Dies at Pittsburgh run a wide spectrum of sizes, styles, age and shut heights. And because the lots tend to be very small, efficient die change is an important part of the Pittsburgh culture.

The plant entered two shifts, both using the same line. The first shift changed from right-hand to left-hand Grand Am fenders. The second shift changed back.

On a difficult six-press tandem line with manual loading, the first shift's 11 team members rattled off a very respectable 9:41 die change. There was, however, a glitch. And it would turn out to be a disastrous omen for the second shift.

During the die transfer, one of the ears broke off the sub-plate and the die was stuck halfway in the press. Some quick thinking pushed it through with the back die cart, but what went unnoticed was the fact that it sheared off the bronze guides on the bottom of the plate.

For the first shift, the problem added an extra minute to the die change time. But for the team that followed....

B-O-C Pittsburgh II

Working with the same equipment they inherited from the first shift, the second shift launched into a 10-person die change. Like the first shift, the team knew that the die carts had new and faster gearing. And to give themselves a bit of an edge, the second team made some program changes to speed the conveyors.

But no sooner had the die change started, when disaster struck. Because the first shift had unknowingly sheared off the guides during its die change, the sub plate wouldn't hold a straight line during transfer. It

TRANSFER LINES

TIME	TEAM	PEOPLE	PRESS	BOLSTERS	PANELS	STEEL	UNION
2:24	Ford Walton Hills	1	Hitachi-Clearing	1	Rocker to Valence	National + USX	UAW 420
2:59	Diamond-Star I	1	Komatsu	2	Hatch to Door	Nippon	UAW 2488
3:09	Diamond-Star II	1	Komatsu	2	2-dr to 4-dr Decklid	Nippon	UAW 2488
4:11	Nissan Mexico	2	Hitachi-Zosen	1	4-dr to 2-dr Rocker	Nippon	STM
4:17	CPC Parma	1	Komatsu	3*	RH to LH Rail	Inland	UAW 1005
4:31	Ford Chicago	1	Komatsu	2	Crown Vic to Gran Marquis	Alcoa Alumin.	UAW 588
5:42	CPC Oshawa	1	IHI	3*	Coupe to sedan decklid	Dofasco	CAW 222
6:04	Honda Marysville	1	Hitachi-Zosen	2	F to R Door	Inland	--
10:35	CPC Grand Rapids	2	IHI	3*	Sedan to wagon rear dr.	National	UAW 730
11:50	CPC Marion	I	IHI	3*	LH to RH door	Bethlehem	UAW 977

* Includes stand-alone double-action press

wedged in the press and the die change had to be aborted while the crane came in to unload dies, pick up the sub plate and reverse the procedure after repairs were made.

But to show that the team's spirit hadn't been broken, it prompted us to time a second attempt. After it sped through a 10:04 die change, the team sat down to tell us that with a little modification to the booms, it felt that seven minute die changes were possible.

"We run 61 different parts on that line," one team member said. "And we do four die changes per shift. Every once and a while, things like that are going to bite you. Heck, that just means you've got to work harder together."

"Hey, we've got Browns and Steeler fans working together here," said another employee. "So if they can work together, this ain't nothing."

Renault Argentina

Renault Argentina's press plant was built by Kaiser Industries in the 1950s. Obviously it's not a new facility; nonetheless, the plant is tidy and well-organized. Even the safety lines on the floor are freshly painted in a gleaming yellow.

With the older-type presses being used, the press shop is fairly labor intensive. Each press is manually fed by two men. Panels are removed by automatic extractors.

When the die change begins five men push the conveyors between presses out of the way. Though the toggle has a moving bolster, the rest of the dies are tugged out of the presses with chains and an overhead crane. The crane moves each die behind a safety line, and the workers line it up with the safety line, then drop it down. It takes nearly four minutes to get the first die into the toggle, as they have to wait for the bolster to build up air pressure.

The team has a good work pace—hurried, but not frenzied. You can tell that the workers are pumped up for the Die Change Challenge. They showed up for their shift two hours early! The first team achieves a time of 15:47, the best yet.

The second shift is inspired by the excellent performance of the first shift, and they set out to beat them. Every movement is done a little quicker. And the anxiety level rises a notch. Sure enough, they achieve a time of 13:32.

The result is met with thunderous applause by the crowd of spectators who have gathered from other areas in the plant. The emotion is unbelievable. Caps are thrown in the air and the workers embrace one another. Their pride shows, not only because of the results of their hard work, but because Argentina has demonstrated it too can compete with the most advanced nations of the world.

Cadillac Grand Blanc

While other plants worked diligently to find a line that could be reduced to a two minute, pushbutton affair, Grand Blanc's "Cadillac Express" team went for chains, cranes and 592,370 pounds of dies. Even more incredible, the decision to do the four-press "V-Line" was made only one week earlier. And there was no practice—none!

Physically, the line poses a real challenge to quick die changes. Quarters are so close that when the automation is run out, it butts up tight against the adjoining line. And a fourteen-member die change team has to coordinate their moves pretty efficiently to stay out of each other's way.

The average time for changing this line was 5.3 hours in the previous month. But after making all the shut heights equal, installing a floating punch in the draw die and using a common skid between presses three and four, the team had turned in a quickest time of two hours and 15 minutes.

With that in mind, we were amazed when we started timing the actual die change. Team members manhandled 4000 pounds of chain, moving 94,000 pound dies sets with uncanny speed. And a cry of "HOSE! HOSE!" from the crowd averted disaster, as a ram nearly came down on a hydraulic line that was draped over the top of a die.

When number three press quit flat on the bottom, team members had to inch it up manually. And then when the first blanks were coming through, the automation dropped three panels.

Still, the first good panel was through in just 23:40, and the specta-

Continued on p. 33

MANUAL TANDEM LINES

TIME	TEAM	PEOPLE	TYPE	PRESSES	PANELS	STEEL	UNION
9:41	BOC Pittsburgh I	11	Danly	6	RH to LH fender	USX	UAW 544
10:04	BOC Pitt. II	10	Danly	6	LH to RH fender	USX	UAW 544
13:32	Renault Argtn. II	15	Bliss/USI Clearing	5	R-11 to R-9 door	Pro. Sid.	SMATA Cordoba
15:47	Renault Argtn. I	15	Bliss/USI Clearing	5	R-9 to R-11 door	Pro. Sid.	SMATA-Cordoba
23:40	Cad. Grand Blanc	14	Danly	4	Riv. to Eldo. roof	Armco	UAW 1292

SEMI-MANUAL TANDEM LINE

TIME	TEAM	PEOPLE	TYPE	PRESSES	PANELS	STEEL	UNION
10:47	Buick City	18	Danly	6	Buick to Olds 1/4 panel	LTV	UAW 599

tors erupted like they'd just won the lottery. "There's not much we can do to make it faster," one team member said. But one of the veterans of Grand Blanc's first die change smiled and said, "That's the same thing we used to say."

AUTOMATED TANDEM LINES

B-O-C Lansing

It's been three years since BOC's Lansing plant entered the Die Change Challenge. What an amazing transformation has taken place!

Back in 1988 it took 20 people over 8½ minutes to make a die change. But this year they did it completely automatic in only 2 minutes and 15 seconds, and won the 1991 Die Change Challenge.

Two fundamental changes took place to allow this dramatic improvement. First, the press line was upgraded with a programmable automatic de-stacker. After a pre-programmed number of blanks have been run through the line, it automatically goes through a die change with absolutely no input from a human being. Second, with the introduction of the 1992 N-cars, the Lansing Automotive Division reduced to five from seven the number of dies needed to stamp out a fender. Not only did this save GM millions of dollars in tooling costs, it drastically reduced die change time.

Interestingly, Lansing also assigned 10 hourly people to the N-car engineering group to give their input for the most effective tool design. "We always said that if they'd get us involved early enough, we'd help make tremendouos improvements," says Gary Watson, chairman of UAW Local 652.

All the improvements to the press line were done in-house by the people on the floor. Even so, everyone involved credit their teamwork, not their new technology, for their improvement. "I wondered if I'd ever see this day at General Motors. It's one of the brightest days in my 27 years at GM – how you've surprised management. The credit is all yours," Mike Camp, the plant manager, tells the team.

Hirotec Japan

Many automotive stamping operations make their own dies. But we only know of one that manufactures its own stamping presses and its own quick die change system. Because of this, we expected Hirotec, supplier of all of Mazda Japan's door assemblies (400,000 per month), to be somewhat of a stamping master. We were correct.

Hirotec is the first stamping shop in Japan to enter *AI*'s Die Change Challenge. Observing a die set in their Hiroshima plant is as pleasurable as watching an expert chef prepare a special dish. There's absolutely no wasted motion during a Hirotec die set, so there's no wasted time. The results are consistently quick, clean die changes – 90 seconds each, on average, and many times per shift.

When we visited, the hot time to beat was 83 seconds. Yet no one in the plant seemed concerned, as this was no aberration. The actual die change we recorded went like this:

At the lead end of the press line, one team member moved the sheetloader, pushed the button to start the die change and move the front die carts. His two partners, stationed at the center and end of the line, moved the gates and conveyors between presses 2, 3, and 4 aside, then pushed buttons to start the movement of their respective die carts. Dies changed, each operator moved his conveyors back, closed the gates, and the new panels were on their way.

It was all over in 87.5 seconds.

There are keys to such world-class times. One is that Hirotec designs its dies to be absolutely as small as possible.

More importantly, the company gives utmost priority to thorough preparation and attention to detail – "standardization of all things involved in the die set," noted stamping manager Mr. Aseada – plus teamwork and the company's HQDC system. (For more on HQDC and Hirotec, see page 46 in this issue.)

By this he means locating each mating surface – cushion pins, automatic clamps, bolsters, conveyors, air couplers, microswitches, sensors – with surgical precision, so they mate up perfectly during the die set. At Hirotec, this is a source of pride.

But Aseada and the Hirotec stamping teams say they are capable of much quicker die changes – in the 40-second range. They're already designing new equipment for this, including faster die carts, new software and fewer conveyors between presses.

It's actually not necessary to set dies in 40 seconds – unless the customer needs it. But process improvement is a daily ritual at Hirotec.

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AUTOMATED TANDEM LINES

TIME	TEAM	PEOPLE	TYPE	PRESSES	PANELS	STEEL	UNION
1:27	Hirotec Japan	3	Hirotec	4	LH to RH door	NKK + Nippon	--
2:15	BOC Lansing	1	Danly	5	LH to RH fender	Inland	UAW 652
2:19	Ford Hermosillo	4	Komatsu	4	LH to RH door	Kawasaki	Sin. Nac.
2:38	Honda Marysville	3	Danly	3	Inner to outer hood	Inland	--
6:07	Chrysler Twinsburg	4	Schuler	6	C-car door to Y-car	Inland	UAW 122
8:22	Honda Alliston	1	IHI	4	US to CN body side	--	--
17:48	Chry. Twinsburg	4	Schuler	5	LH to RH door	Nippon	UAW 122

Honda Alliston

The folks at Honda's plant in Alliston, Ontario in Canada have been using the Die Change Challenge to help improve their stamping operations. And the results really show.

Last year they concentrated on getting process improvements, while this year they worked on improving their equipment and software. Specifically, they reduced the amount of equipment that has to be changed, and rewrote their software to so that it runs in sequential instead of overlapping sequences. They also involved a whole new group of people in their preparation to get more associates involved in the competition.

A year ago Alliston used four people on its die change team. But with the new improvements, the new team only consisted of one person, Russ Pelten, who proved he truly knows how his press works.

Everything ran perfectly smooth as the die change got started, but about halfway into it, the automation on one of the presses balked. In a flash, Pelten immediately figured out what was wrong. He hands were a blur as he flipped switches and pushed buttons, and manually ran the press through its operation.

As it turned out, the die change was slower than the Honda people had hoped for. Nonetheless, by reducing the number of people needed to do the die change, they achieved a whopping 67% productivity improvement over last year.

Honda Marysville II

A phrase we hear over and over in our travels is: "I don't how we could improve on what we just did." We heard it from last year's team on Honda's B-line. And since we didn't believe it then, we weren't surprised to see Honda take a quantum leap in reducing its number of employee-minutes for this year's effort.

The trick was to upgrade B-Line's manual clamps to automatic. And with that one modification, Honda reduced its manpower from six to three. The team was also quick to point out that the clamps have made routine die changes safer. That's because there's less people involved.

For the sake of our challenge, B-Line changed from the Accord hood stiffener to the hood outer – the fastest part-to-part the line runs. In more complicated changes, the line usually has five or six people, and a die change of about eight minutes is typical.

But when the official clock started, the operation flowed much faster. The three members of the die change team had their moves carefully timed and there was no wasted motion or waiting for another team member to finish their job. As the safety gates closed and the first panel moved in, the team wore a look of confidence.

The first panel came out in 2:36 – a new record for this line. And though the crowd that had gathered was pretty subdued in comparison to other plants, all wore that Honda-proud smile that said "Relax, we do this all the time."

Ford Hermosillo

From the moment we arrived at Ford's Hermosillo plant (220 miles south of Tucson, AZ) we could see the die change team was anxious. Problems had developed with the #3 press on the previous shift, and everyone was concerned that the press might act up again and hamper their efforts.

Happily, the maintenance crew had identified and eliminated the cause of the problem because this well-choreographed group of workers went to turn in their best time ever.

Not only did the team accomplish this die change with fewer people (four people this year vs. five people last year), they managed to knock more than half a minute off last year's time. This gave them a 64% productivity improvement!

They were able to reduce the number of people on the team by choosing similar-type panels that did not require a change of tooling (extractors). Then, through better planning and organization, they were able to reduce their time. For example, when the operator on press #1 finishes his tasks, he moves down the line to assist the next operator.

Interestingly, the team feels it can do even better next year. "We know we can go under the two-minute mark," a confident operator assures us.

Chrysler Twinsburg I

You'd never guess the automotive industry is in a slump by visiting Chrysler's Twinsburg Stamping plant. This place is *busy*. Twinsburg's 29 major stamping lines (20 of them dedicated to doors) have been running 23 load-hours a day, including preventive maintenance (PM). In a typical shift, the two press lines we observed change dies three times and run eight different parts – 16,300 pieces every day.

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That's full-tilt production in anybody's ledger.

In addition to stamping and assembling door panels for most Chrysler cars and large vans, Twinsburg stamps minivan dash panels, A-car bodyside apertures and front fenders. Twinsburg is also doing some die construction ('93 Dodge T300 pickup).

But how quick are these guys on die sets? Last year Twinsburg absolutely smoked our Tandem Press category, with a blistering 2:35 set. That's a tough time to beat, and both teams entered knew it. In fact, they'd been in at 4 AM to practice on the day *Automotive Industries* arrived.

Schuler Line #2 was up first. Within 90 seconds after our stopwatch clicked on, the T-burg boys looked like they might again crack the 3:00 mark – no sweat, smooth as silk. But an inexpensive coupling on Press 1 came loose, stretching Line #2's die change time to a still-commendable 6:07.

On deck was Schuler Line #1, entered at the last moment with untried tooling – "cold turkey," as a team member described it. When the stopwatch finally stopped at 17:46, the team had given their best shot. But it was clear that Line #1 needed to be set up like Line #2, in order to be in the hunt.

The ultra-competitive Twinsburgers are already looking at solutions: Shut heights were off by as much as six inches between dies, and would have to be standardized. So would handler settings. Automation software could be tweaked. Speed of bolsters, clamps and lift cylinders could be boosted by fitting larger hydraulic lines and perhaps even adding a separate hydraulic system for the clamps.

Both Twinsburg teams are confident about doing sub-2:00 die sets on their lines next year.

B-O-C Buick City

It was Friday the 13th. It was the first time this line was entered in the Die Change Challenge. It was all-new automation. And there were only three days to practice.

No problem. These guys are seasoned pros.

As the last panel moved through the presses, the 18-man die change team moved right in behind it to break them down. But when it got to the automatic extractor on the last press, there was a long pause before it moved in to be stamped.

Officially, the word is that the last press gate was opened too soon and it shut everything down. And even though we were watching the first presses being completed (without benefit of our watch running) we were assured that it offered no advantage and wasn't planned. Hmmmm.

When the last panel finally hit the conveyor, the die change was actually well underway. Unlike last year's line, the automation had to be run out to make the change, so it was expected that it would take a bit more time. In practice the team had managed a best effort of 14:00. When our clocks stopped at 10:47, team members were pleasantly surprised, especially the member who had 10:47 in the betting pool.

Could it have been faster? Well, the team says that with a little practice they could cut the number of people considerably. And when they get the automation working the way they want...well...just wait until next year.

THE RESULTS

We have three basic categories in the Die Change Challenge: transfer lines, manual tandem lines and automated tandem lines.

MOST IMPROVED TEAMS
(% IMPROVEMENT IN EMPLOYEE-MINUTES)

TEAM	1991	1990	1989
1. B-O-C Lansing	98%*	--	--
2. Ford Walton Hills	70%	--	--
3. Honda Alliston	67%	--	--
4. Ford Hermosillo	64%	22%	--
5. Honda Marysville II	54%	12.7%	12.4%
6. Honda Marysville I	9.5%	--	--

*Compared to 1988

Yet even with these different categories, we don't have an exact comparison between teams because there are so many different kinds of press lines.

That's why we've included the charts on each category. This will allow you to factor in the variables, such as the number of bolsters, or presses that were involved.

Now for the results.

Transfer Line Category: Ford's Walton Hills showed that it is not only the fastest, it is the most efficient.

Manual Tandem Line Category: B-

O-C's Pittsburgh team was both fastest and most efficient.

Automated Tandem Line Category: B-O-C's Lansing team showed that it was the most efficient.

Fastest Team: Hirotec's entry from Hiroshima, Japan. These guys are really good. When the object is to change from making one set of parts to another, Hirotec has shown it is the best in the world.

Overall Winner: B-O-C's Lansing team took first place in *Automotive Industries'* 1991 Die Change Challenge. Not only was the Lansing team the most efficient, since 1988 the team has achieved an amazing 98% improvement in efficiency.

In closing, it's important to remember that really all the entrants in the competition were winners. These 23 teams represent the best die change operators in the automotive industry. AI